

Eurasian Dace (*Leuciscus leuciscus*)

Ecological Risk Screening Summary

Web Version—07/29/2014



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1 Native Range, and Status in the United States

Native Range

From Kottelat and Freyhof (2007):

“Europe and Asia: North, Baltic, White and Barents Sea basins; Caspian basin, in Volga and Ural drainages; Black Sea basin, from Danube to Dniepr drainages; Atlantic basin, in Seine drainage; Mediterranean basin from Rhône to Arch drainages (France). Only very localized in Danube main river in Romania, in Scandinavia north of 69°N and most of [central] Finland.”

Status in the United States

This species has not been reported in the United States.

Means of Introductions to the United States

This species has not been reported in the United States.

Remarks

From Kottelat and Freyhof (2007):

“Populations from Siberia and East Asia usually referred to *Leuciscus leuciscus* are distinct species, *Leuciscus baicalensis* and *Leuciscus dzungaricus*.”

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2012):

“Kingdom Animalia
 Phylum Chordata
 Subphylum Vertebrata
 Superclass Osteichthyes
 Class Actinopterygii
 Subclass Neopterygii
 Infraclass Teleostei
 Superorder Ostariophysi
 Order Cypriniformes
 Superfamily Cyprinoidea
 Family Cyprinidae
 Genus *Leuciscus*
 Species *Leuciscus leuciscus* (Linnaeus, 1758)

Taxonomic Standing: Valid.”

Size, Weight, Age

From Kottelat and Freyhof (2007):

“Maturity: Lm 17.9 range ? - ? cm; Max length : 40.0 cm TL male/unsexed; (Billard 1997); common length : 15.0 cm TL male/unsexed; (Muus and Dahlström 1968); max. published weight: 1.0 kg (Billard 1997); max. reported age: 16 years (Wüstemann and Kammerad 1995).”

Environment

From Kottelat and Freyhof (2007):

“Freshwater; brackish; pH range: 6.0 - 8.0 benthopelagic; potamodromous (Riede 2004); depth range 1 - ? m.”

Climate/Range

From Kottelat and Freyhof (2007):

“Temperate; 4 - 22°C (Wüstemann and Kammerad 1995); 72°N - 41°N, 10°W - 155°E.”

Distribution

Native

From Kottelat and Freyhof (2007):

“Europe and Asia: North, Baltic, White and Barents Sea basins; Caspian basin, in Volga and Ural drainages; Black Sea basin, from Danube to Dniepr drainages; Atlantic basin, in Seine drainage; Mediterranean basin from Rhône to Arch drainages (France). Only very localized in Danube main river in Romania, in Scandinavia north of 69°N and most of [central] Finland.”

Introduced

This species is reported as introduced in France (Keith and Allardi 2001), several lakes in central Italy (Bianco 2014), and Ireland (FAO 1997, Kottelat and Freyhof 2007).

Means of Introduction Outside the United States

From Kottelat and Freyhof (2007):

Reasons reported for species introductions include ornamental and accidental release of baitfish.

Short description

From Kottelat and Freyhof (2007):

“Dorsal spines (total): 2 - 3; Dorsal soft rays (total): 7 - 9; Anal spines: 3; Anal soft rays: 8 - 9; Vertebrae: 42 - 46. Diagnosed from congeners in Europe by the following characters: subinferior or subterminal mouth; subequal jaw, upper jaw slightly longer; upper lip tip about level with center of eye; not projecting snout; articulation of lower jaw distinctly behind anterior margin of eye; horizontal branch of preoperculum shorter than vertical branch; and 40-50 + 1-2 scales on lateral line (Welcomme 1988). Rarely longer than 30 cm TL; normally 47-52 scales in lateral line; anal fin concave; caudal fin forked with 19 rays (Wüstemann and Kammerad 1995).”

Biology

From Kottelat and Freyhof (2007):

“Gregarious fish which swims near the surface (Billard 1997). Inhabits moderate to fast-flowing large streams to large rivers with rock or gravel bottom. Adults aggregate in dense swarms in winter in the lower reaches of rivers or backwaters and often migrate to spawning streams in autumn and overwinter there. Juveniles spend winter in cavities along the shores. Early juveniles occur in very shallow shoreline habitats and when they grow, they leave the shores for faster-flowing waters. Feeding larvae thrive along shores. Prey on small invertebrates. Spawns in fast-flowing water on shallow gravel beds, often in small tributaries (Welcomme 1988). Breeds in March and April (Billard 1997). Pale yellow eggs are found attached to gravel and stones in shallow, flowing water (Pinder 2001).”

Human uses

From Kottelat and Freyhof (2007):

“Fisheries: of no interest; gamefish: yes; bait: usually.”

From Mascó and Veiga (2012):

“The common dace is without interest to the aquarium trade, but is considered a valuable species in aquaculture (FAO 1997) and also has interest as a bait fish and angling species.”

Diseases

None reported.

Threat to humans

Potential pest.

3 Impacts of Introductions

From Kottelat and Freyhof (2007):

“Gained access to [Ireland] through the accidental release of baitfish. Common in river backwaters and considered a nuisance because it invades salmonid fisheries (FAO 1997).”

From Mascó and Veiga (2012):

“*L. leuciscus* does not represent a risk for humans but it may cause changes in ecosystems (i.e. altering food web structures and nutrient cycling). In Ireland, it threatens native salmonids because dace, trout and salmon have similar habitat preferences. In the Munster Blackwater, efforts have been made to improve the spawning grounds for salmonids, but dace have moved into the area in large numbers successfully competing against the salmonids for spawning sites and also for food (Caffrey et al. 2007). Common dace may predate on juveniles of native species

and there is a risk of hybridization with closely related fish species, in particular with other members of the *Leuciscus* genus.”

“Risk and Impact Factors

Invasiveness

Abundant in its native range
Benefits from human association (i.e. it is a human commensal)
Capable of securing and ingesting a wide range of food
Fast growing
Gregarious
Has a broad native range
Has high reproductive potential
Highly mobile locally
Long lived
Proved invasive outside its native range”

“Impact outcomes

Altered trophic level
Ecosystem change/ habitat alteration
Modification of natural benthic communities”

“Impact mechanisms

Hybridization
Rapid growth”

“Likelihood of entry/control

Difficult/costly to control
Highly likely to be transported internationally deliberately
Highly likely to be transported internationally illegally”

From Caffrey et al. (2007):

“The most pressing of the threats posed by dace is the impact on native salmonids. Dace, trout and salmon have similar habitat preferences and all spawn over gravels in fast flowing water. Efforts to create and improve breeding grounds for salmonids in the Munster Blackwater have been hampered by dace moving onto the newly introduced gravels at spawning times (O’Grady M., pers. comm.). This not only limits the breeding grounds available to salmonids but also increases the number of dace present, through successful spawning of the latter. During the summer months the dace feeds heavily on the same aerial insects as juvenile salmon and trout (Weatherley, 1987). Due to the high densities in which dace are found, this can create a substantial drain on the food available to salmonids. Similarly, large shoals of dace will actively compete with the coarse fish already resident in the river.”

From Winfield et al. (2010):

“The arrival of roach, and to a much lesser extent ruffe and dace, has had a major positive impact on fisheries activities at Bassenthwaite Lake [United Kingdom]. Although quantitative data are unavailable, a significant number of anglers visit the lake to fish for these species and thus augment the activities of a more established although small-scale recreational fishery for brown trout, the population of which now seems to be relatively low. Angling for pike is also popular and this predatory species, the numbers of which may be encouraged by the fish introductions, is now the main quarry of boat-based anglers.”

“The later arrivals of roach, dace and ruffe in Derwent Water [United Kingdom] have so far had relatively little effect on local fisheries activities when compared with the situation at Bassenthwaite Lake.”

Important note: The above sources hypothesize about possible impacts of the introduction of *Leuciscus leuciscus* based on its biology, but there are no known sources which detail actual evidence of impacts.

4 Global Distribution

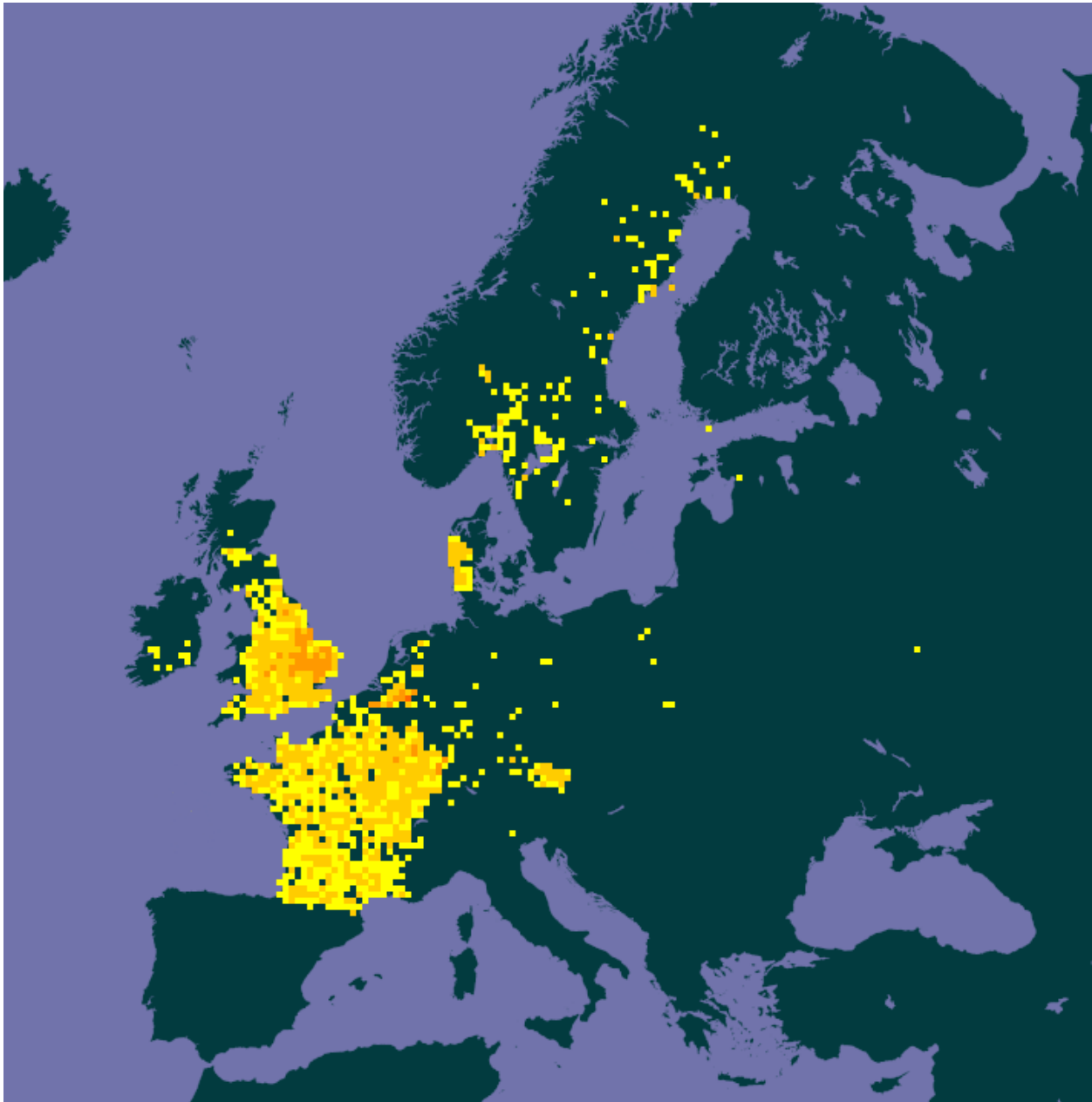


Figure 1. Known global locations of *Leuciscus leuciscus*. Map from GBIF (2014). Locations in Siberia were excluded due to incorrect species identification. Locations off the coast of France and Germany were excluded due to incorrect positioning.

5 Distribution within the United States

This species has not been reported in the United States.

6 CLIMATCH

Summary of Climate Matching Analysis

The climate match (Australian Bureau of Rural Sciences 2008, 16 climate variables; Euclidean Distance) was high in the Great Lakes region, and near the Puget Sound (Fig. 3). Medium matches covered the majority of the country. Low matches occurred along the Gulf of Mexico and in Florida, Arizona, and Nevada. Climate 6 match indicated that the contiguous U.S. has a high climate match. The range for a high climate match is 0.103 and greater; climate match of *Leuciscus leuciscus* is 0.266.

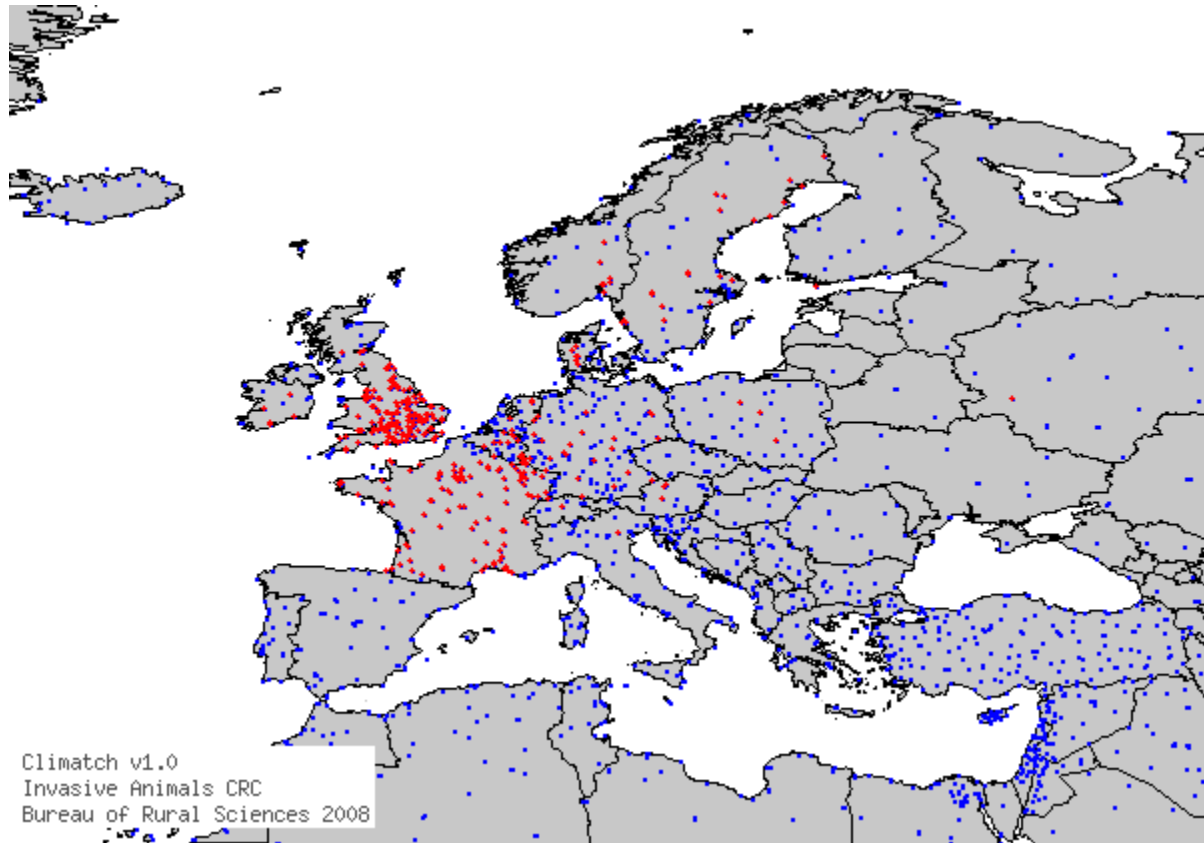


Figure 2. CLIMATCH (Australian Bureau of Rural Sciences 2008) source map showing weather stations selected as source locations (red) and non-source locations (blue) for *Leuciscus leuciscus* climate matching. Source locations from GBIF (2014).

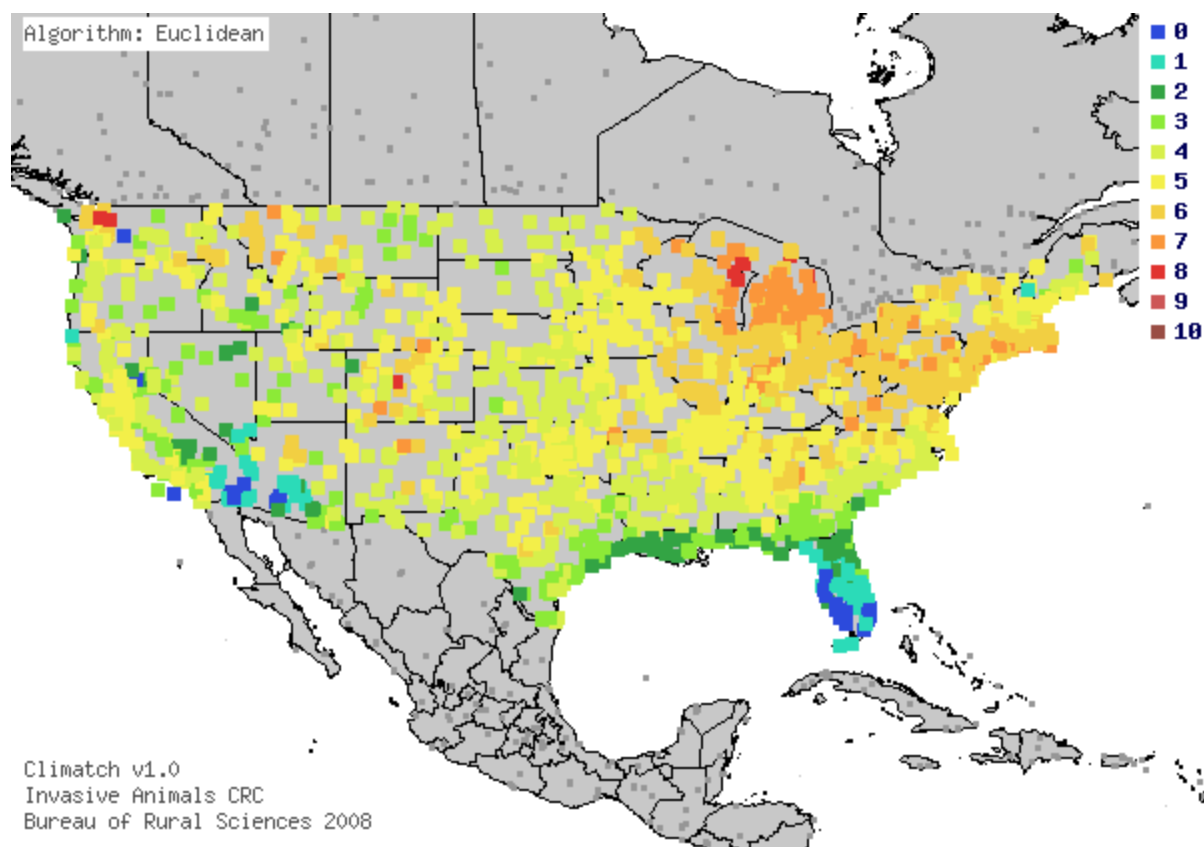


Figure 3. Map of CLIMATCH (Australian Bureau of Rural Sciences 2008) climate matches for *Leuciscus leuciscus* in the contiguous United States based on source locations reported by GBIF (2014). 0=Lowest match, 10=Highest match.

Table 1. CLIMATCH (Australian Bureau of Rural Sciences 2008) climate match scores.

CLIMATCH Score	0	1	2	3	4	5	6	7	8	9	10
Count	39	70	95	188	499	557	418	99	9	0	0
Climate 6 Proportion =		0.266									

7 Certainty of Assessment

Information on the biology of this species is abundant. However, the impacts caused by introduction of this species are still uncertain. More information on impacts is needed before certainty of this assessment can be anything but low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Leuciscus leuciscus is a freshwater fish native to areas of Europe and Asia. It has been introduced to non-native locations in Italy, Ireland, and France. FishBase lists *Leuciscus leuciscus* as a “potential pest,” and FAO lists “adverse ecological effects,” but there is little information on whether impacts have been observed. This species has not been reported in the U.S. It has an overall high climate match with the contiguous U.S. The overall risk for this species is uncertain; further research will be needed to determine the true risk of this species.

Assessment Elements

- **History of Invasiveness(See Section 3):** Uncertain
- **Climate Match (See Section 6):** High
- **Certainty of Assessment (See Section 7):** Low
- **Overall Risk Assessment Category: Uncertain**

9 References

Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in Section 10.

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10 References Quoted But Not Accessed

Note: The following references are cited within quoted text within this ERSS, but were not accessed for its preparation. They are included here to provide the reader with more information.

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